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ABSTRACT

Replicating research completed in 1986, a study determined the relationship among cognitive laterality, gender, and reading comprehension for African-American students, as well as gender differences in cognitive laterality and in reading comprehension. Subjects, 40 African-American males, 41 African-American females, 12 White males, and 17 White females ages 16-18 and from the same school as the earlier study, completed a standardized reading test and a cognitive laterality battery. Results, similar to those of the earlier study, indicated no relationship between reading comprehension and cognitive laterality for either females or males. Nor were there any differences between the reading scores of females and males. However, the laterality of the females was significantly different from the laterality of the males, with the females showing a left-laterality preference; the African-American males only marginally favored right laterality. Results of a post hoc analysis of variance for African-America and White students indicated significant racial and gender differences in laterality and a significant racial difference in reading comprehension. (Contains 28 references and 2 tables of data.) (RS)

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Race and Gender Differences in Cognitive Laterality: Implications for Leadership

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Abstract

This research replicates a study done in 1986 by the first author; both studies determined the relationship between cognitive laterality, gender and reading comprehension for African-American students. These studies also examined gender differences in cognitive laterality and in reading comprehension. Four null hypotheses were tested.

Both studies had similar results. There was no relationship between reading comprehension and cognitive laterality for either females or males. Nor were there any differences between the reading scores of females and males. However, the laterality of the females was significantly different from the laterality of the males with the females showing a left-laterality preference; the African-American males only marginally favored right laterality. As a post hoc analysis ANOVAs were calculated for African-American and white students in the 1994 sample to determine inter-group variability. The results of the inter-group comparisons indicated that there were significant racial and gender differences in laterality and a significant racial difference in reading comprehension.

Race and Gender Differences in Cognitive Laterality: Implications for Leadership

There is a striking lack of published research that deals with African-American students and their academic achievement. This was true in 1986 when the original research study was completed and has not improved even though the academic status of African-American students, and particularly the African-American male, continues to decline (Bridges, 1986; Gibbs, 1988; Hatchett, 1986; "Hearing on," 1990; Keller, 1987; Levin & Havighurst, 1984; "The African-American Male," 1990; Wesson, 1994). In fact, there has been so much concern for the general status of the African-American male in this society that during the years 1990-1992 both the National Association for the Advancement of Colored People (NAACP) and U.S. Congress held conferences on the "endangered African-American male" (Narine, 1992).

Although the research on African-American academic achievement is scarce, some research indicates there is a difference in male-female academic achievement and that black females attain a higher level of achievement than black males early in their academic careers ("Educating Black Male," 1988). In Chicago, by the third grade, black males trailed all other groups in

math in contrast to every other ethnic group where males significantly outperformed females ("Odds Stacked Against," 1990). By age 13, 44% of black males were one or more years below grade level, but within this same age group only 33% of black females, 30% of white males and 22% of white females were one or more years below grade level (Simmons & Mitchell, 1990).

An ERIC search in the 1982-94 database specifically points to the nature of the problem. Of the 2,007 records on "reading achievement", there is only 1 on "reading achievment" and "black students," "male" or "female." There are 14,083 records on "academic achievement." Although 655 of those records are on "academic achievement and black students," only 17 are on "academic achievement and black females, and 39 are on "academic achievement and black males." Similarly, there are only 35 records on "secondary education, reading achievement and black students" with only 1 of those 35 articles specifically targeting either "black males or females." There are only 264 records on "secondary education, academic achievement and black students" and of those only 4 dealing with "black females" and 10 dealing with "black males." Relative to "creativity," there are 2,973 records of which only 9 records addressing "black students" are

included. Of those only 1 record deals specifically with "black males" and none deal with "black females."

In 1992 Sandra Graham did a content analysis of six leading APA journals for articles on African-Americans and found that little research on African-Americans has been published in these journals (cited in Padilla, 1994). Although Padilla (1994) contends that ethnic-related research may be finding its way into more popular ethnic journals such as Journal of Black Psychology and the Journal of Negro Education, these journals do not have a wide circulation among practitioners.

The purpose of the present study is to discover the degree to which students process information differently. By analyzing the preferred cognitive processing mode of African-American and white high school students, this study attempts to determine the effect of laterality and gender on reading comprehension.

Methods

A standardized reading test to measure reading comprehension and the Cognitive Laterality Battery (Gordon, 1986) were administered to a sample of African-American and white students in 1986 and 1994. These tests were administered in 1986 to seventy-two

(72) African-American males, sixty-seven (67) African-American females, ages 16-18; in 1994 the standardized reading test and the Cognitive Laterality Battery were administered to forty (40) African-American males, forty-one (41) African-American females, twelve (12) white males and seventeen (17) white females, ages 16 to 18. The standardized reading test used in 1986 was the reading test from the Advanced-2 Level of the Metropolitan Achievement Tests, Sixth Edition, (MAT-6); the reading test from the Stanford Test of Academic Skills, Third Edition, was the standardized reading test administered in 1994. The 1994 research sample was taken of students from the same school and the same grade as that of the 1986 sample.

Since a purpose of the 1994 study was to replicate the 1986 research, we posed the same four null hypotheses used with the African-American population in the 1986 study:

Hypothesis 1. There is no significant relationship between reading comprehension and cognitive laterality for the males in this population.

Hypothesis 2. There is no significant relationship between reading comprehension and cognitive laterality for the females in this population.

Hypothesis 3. There is no significant difference between the cognitive laterality of males and females in this population.

Hypothesis 4. There is no significant difference between the reading comprehension of males and females in this population.

A post hoc ANOVA using the black and white 1994 populations, was performed to determine racial and gender differences for laterality and reading comprehension; an analysis we were unable to do with the 1986 sample.

Findings

In 1986 and in 1994, hypotheses 1,2, and 4 were retained. Hypothesis 3 was rejected. Both sets of data indicate that there was no statistically significant correlation between reading comprehension as measured by the Reading Comprehension Test of the MAT-6 for 1986 and Stanford Test of Academic Skills for 1994 and cognitive laterality as measured by the Cognitive Laterality Battery for either males or females in the samples. The results of the t-test indicated that there was no significant difference between the reading comprehension of the males and females, but there was a significant difference between the cognitive laterality of the males and females.

SUMMARY OF RESULTS

Cognitive Laterality and Reading Among Black High School Students				
Year	Reading and Laterality		Mean Comprehension	Mean Laterality
	Male	Female	Between Genders	Between Genders
1986	r = -.05	r = -.074	t = 1.09	t = -5.27 **
1994	r = .015	r = .146	t = - .68	t = 2.70 *

Note: 1986: N=72 males, 67 females. 1994: N=40 males, 41 females.
Note: Correlations were Pearson r
*P ≤ .01 **P ≤ .001

Data from the 1994 sample of African-American and white students were used to test for significant differences between laterality and reading comprehension for the total sample. The findings are as follows: if the sample is aggregated by race and gender, there are significant differences in laterality and reading comprehension for both race and gender, but no significant interactions can be found among laterality, race and gender. With regard to reading comprehension scores, there is a two-way interaction by race and gender that is close to significance (P≤=.088). The mean scores on the laterality test of the sample aggregated by race indicate that the African-American population slightly favored left laterality and the white population showed a definite

right-laterality preference.

ANOVA SUMMARY

1994 Data on Inter-Group Comparisions			
	Comprehension		Laterality
Variable	Means	F Ratio	F Ratio
Gender		.043	8.706*
M	31.8127		
F	32.1525		
Race		45.42**	20.894**
B	29.0723		
W	40.2667		
Gender x Race		2.960	.251

Note: African-American students: N=40 males, 41 females
Note: White students: N=12 male, 17 female students
*P≤.001 **P≤.0001

Conclusions

Dramatic changes have taken place since the original split-brain research (Sperry, 1968) and the resultant speculations connecting education to brain research. Some of these connections include the recognition of different learning styles (Dunn, 1990), multiple intelligences (Gardner, 1982) and Koestler's idea that "everything is a part of something bigger and is itself made up of parts" (cited in Caine & Caine, 1991). Recently Caine and Caine (1991) have focused attention on the correlation between understanding brain processes and effective teaching methods. Even

though there is little agreement about the relationships among cognitive laterality, gender and reading achievement (Bannatyne, 1971; Blaha, 1982; Denno, 1983; Diamond, 1988; Gardner, 1982; Harness, 1984; Kaufman, 1979; Levy, 1985; Maccoby & Jacklin, 1985; Synmes & Rapoport, 1974), studies that rely on brain research suggest that individualizing instruction and allowing students to interact in enriched environments are critical components of exemplary instruction (Hart, 1983; Bennett, Diamond, Krech, & Rosenzweig, 1964).

Although schools might have traditionally relied on left lateral orientations, and it has been suggested that African-American students may not fit these expectations (Hale-Benson, 1983; Hilliard, 1992; Dunn, 1990), these two studies do not necessarily support that position. These findings indicate that an orientation toward left or right laterality is not related to reading comprehension for either males or females. The data from the 1986 study and 1994 replicated study do suggest that male and female African-American students have a significantly different cognitive laterality; the female students showed a preference for left laterality, and the males had a marginally right laterality preference. The post

hoc analysis with the broader sample continued the motif that males and females have different lateralities but are not significantly different in their reading comprehension skills. Furthermore, we did find that blacks and whites as a group had different laterality preferences and, as might have been predicted, that white students scored higher on standardized reading tests. It is interesting to note that the sample means for the African-American and white students indicate that the African-American population slightly favored left laterality and the white population showed a definite right-laterality preference.

Of course, we do not presume to go beyond the data with these findings. Clearly the N in the 1994 study is small (81 African-American students and 29 white students), so it is tenuous to make inter-group comparisons; and I agree with Amado Padilla (1994):

> Good science is not achieved because we grossly compare two ethnic or racial groups without clearly understanding how the two groups differ in terms of the behavioral manifestation of culture, language, and/or ethnicity. . . . our priority should be the development of ethnic knowledge. . .

Nevertheless, this data is valuable in that it advances dialogue about the impact of various influences on black academic achievement. The data in this study substantiates that there are gender and racial differences in cognitive laterality and these differences don't seem to be tied to reading comprehension. In fact, these studies suggest that student laterality is not closely tied to standardized reading test scores.

It is hoped that this reseach will initiate "honest discourse" about teaching strategies that are successful with both African-American and white students who, as evidenced in this study, seem more alike than different.

References

Bannatyne, A. (1971). Language, reading and learning disabilities. Springfield: Charles C. Thomas, Publisher.

Bennett, E.L., Diamond, M.C. Krech, D., & Rozenzweig, M.R. (1964). Chemical and anatomical plasticity of the brain. Science, 146, 610-619.

Blaha, J. (1982). Predicting reading and arithmetic achievement with measures of reading attitudes and cognitive styles. Perceptual and motor skills, 55(1), 107-14.

Bridges, R. E. (1986). Black male child development: A broken model. Paper presented at the Annual Conference of the National Black Child Development Institute.

Caine, R., & Caine, G. (1991). Making connections: Teaching and the human brain. Alexandria, VA: Association for Supervision and Curriculum Development.

California State Legislature, Black Legislative Caucus. (1990). The African-American male: An endangered species. Sacramento, CA: Author.

Congress of the U.S., House Committee on Education and Labor. (1990). Hearing on the Office of Educational Research and Improvement. Washington, D.C.: Author.

Denno, D. D. (1983). Neuropsychological and early maturational correlates of intelligence. Prepared at the Center for Studies in Criminology and Criminal Law, The Wharton School, University of Pennsylvania.

Diamond, M. (1988). Enriching heredity: The impact of the environment on the anatomy of the brain. New York: The Free Press.

Dunn, R. (1990). Cross-cultural differences in learning styles of elementary-age students from four ethnic backgrounds. Journal of Multicultural Counseling and Development, 18(2), 68-93.

Gardner, H. (1985). Frames of mind: The theory of multiple intelligences. New York: Basic Books.

Gibbs, J.W. (1988). Conclusions and recommendations. In J. W. Gibbs (ed.). Young, black and male in America: An endangered species. Dover: Auburn Publishing Company.

Hart, L. (1983). Human brain, human learning. New York: Longman.

Hatchell, D. (1986, March). A conflict of reasons and remedies. Crisis, 93(3), 46-47.

Hale-Benson, J. E. (1982). Black children: Their roots, culture, and learning style (rev.ed.). Baltimore: Brigham Young University.

Hilliard, A. G. (1992). Behavioral style, culture, and teaching and learning. Journal of Negro Education, 61(3), 370-377.

Kaufman, A. S. (1979). Cerebral specialization and intelligence testing. Journal of Research and Development in Education, 12(2), 96-107.

Keller, G. (1989). Review essay: Black students in higher education: Why so few? Planning for Higher Education, 17(3), 43-57.

Levy, J. (1985, May). Right brain, left brain: Fact and fiction. Psychology Today, 19, p. 38.

Maccoby, E., & Jacklin, C. (1974). The psychology of sex differences. Stanford: Stanford University Press.

Narine, M.L. (1992, April 15). Single-sex, single-race public schools: A solution to the problems plaguing the black community? (ERIC Document Reproduction Service No. ED 348 423)

Odds stacked against young black males. (1991, November 24). Chicago Tribune. p. 16.

Orleans Parish School Board. (1988). Educating black male youth: A moral and civic imperative. New Orleans, LA: Author.

Padilla, A.M. (1994). Ethnic minority scholars, research, and mentoring: Current and future issues. Educational Researcher, 23(4), 24-27.

Simmons, W., & Mitchell, G. (1990). Prince George's County Public Schools. Black male achievement: From peril to promises: Report of the superintendent's advisory committee on black male achievement. (Eric Document Reproduction Service No. ED 333054)

Sperry, R. (1968). Hemisphere disconnection and unity in conscious awareness. American Psychologist, 23, 723-733.

Synmes, J., & Rapoport, J. (1972, January). Unexpected reading failures. American Journal of Orthopsychiatry, 42(1), 82-91.

Wesson, L. (1994). Leadership and Diversity. In 1994 NCPEA Yearbook. Lancaster, PA: Techomic Publishing Co.